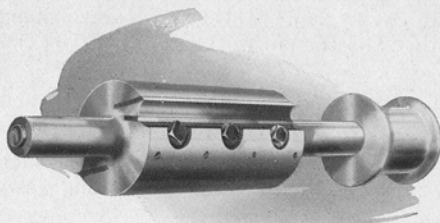


No. 560 Bench Jointer

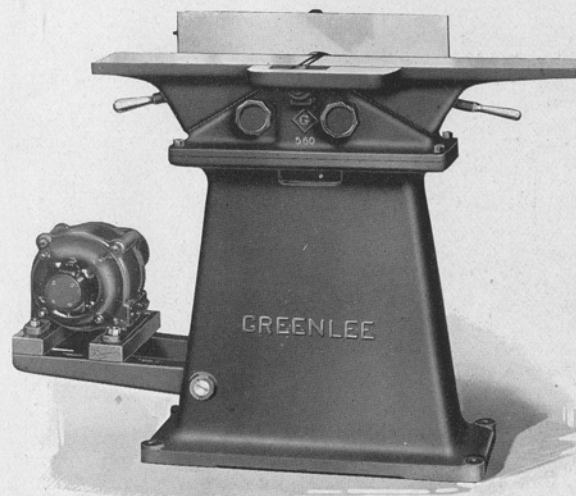
THE Design of this Bench Jointer presents no radical departure from the approved types of the past but the details have been worked out to a higher degree of refinement. The height is only 8 inches which makes it especially suitable for placing on a work bench of ordinary height.

The Tables are 41½ inches overall, 8 inches wide and have an effective working width of 6½ inches. They raise and lower on long gibbed inclines and permit easy access to the knives. The adjustments are made by hand wheels which rotate the adjusting screws through spiral gears. The gauge is 24 inches long and is attached to the rear of the delivery table. It can be set for bevel work up to 45 degrees and has 3-inch cross adjustment. An improved safety knife guard can be furnished as an extra.

The Cylinder is of the circular safety type with thin knives firmly held in place. They are 6½ inches long and have a 3¼-inch cutting circle. The cylinder bearings are long self-oiling capped boxes with an adjustable thrust bearing at the front to take up end play. The flanged pulley is 2½x3 inches and should run between 5000 and 6000 R. P. M. to obtain the best results.



Safety Cylinder



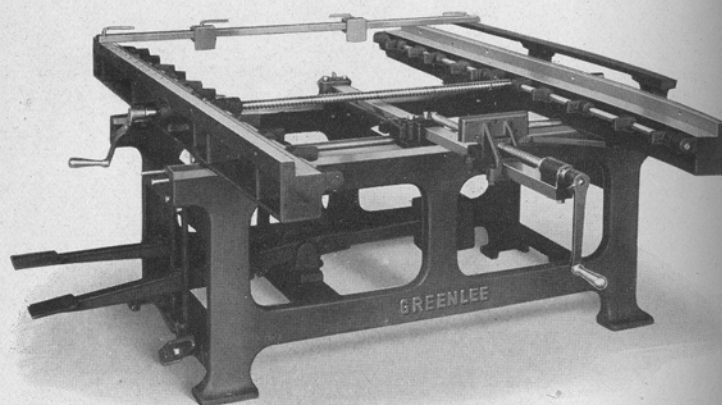
No. 560 with Pedestal Base and Motor Bracket

A Pedestal Base of cast iron can be supplied for mounting the jointer. It is 28 inches high and has an internal chute for discharging shavings at the rear or for connecting to an exhaust system. A bracket with quadrant adjustment for belt tension can be attached to this base for motor drive. A ½ or 1 H. P. 1800 R. P. M. motor is recommended.

A Sub-Base Plate 4 inches high, with end handles for portability, can be furnished when desired. It is arranged to support the Jointer and motor on 28-inch pulley centers and is provided with a wire mesh guard for the belt.

When Belt Driven, a separate countershaft is furnished having tight and loose pulleys 8 inches in diameter with 3¼-inch face. The speed should be about 1000 R. P. M.

| No.                                         | Wt. in Lbs. | Code      |
|---------------------------------------------|-------------|-----------|
| 560 with separate Countershaft              | 400         | RAINWASH  |
| 560-X without Countershaft                  | 335         | RAINWATER |
| Pedestal Base, extra                        | 275         | PEDESTAL  |
| Motor Bracket attached to base, extra       |             |           |
| Sub-base Plate for Jointer and Motor, extra |             |           |
| Safety Knife Guard, extra                   |             |           |



### No. 599 Quick Acting Frame or Furniture Clamp

THE clamping of furniture frames does not require the power of a door clamp nor the swivel corner action of a sash clamp. Usual construction, however, requires clamping on four sides and this is secured in our present two-way clamp by using two rails, a squaring bar and an auxiliary cross clamp.

The Two Main Rails are 6½ feet long and have wide planed faces to receive the material or to hold special forms. A heavy square thread screw adjusts the rear rail and is also connected to the foot lever for the forward clamping motion.

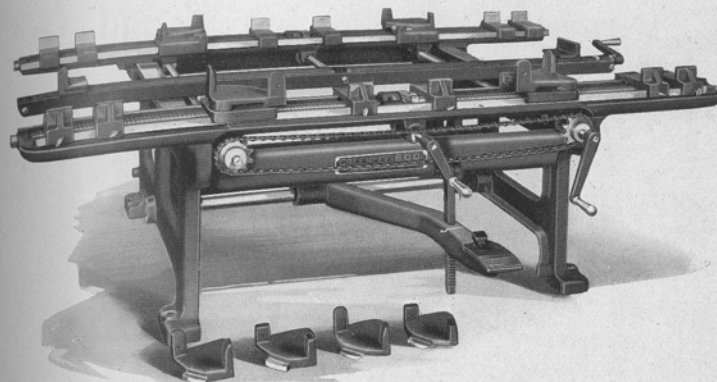
The Cross Clamp is mounted on an adjustable supporting bar and works in conjunction with the adjustable squaring bar at the left. Its jaw is also adjustable on the supporting bar, but the clamping pressure is secured by the second foot lever.

The Adjustment is from 20 inches to 6 feet in length and from 14 inches to 4½ feet in width. Filling strips are used for smaller work. Miter frames are clamped by pressing both foot levers together to obtain equal movement in both directions.

Stop Rods and stops for setting intermediate bars in case backs or frames are shown in the cut, but these may be omitted.

| No. | Capacity   | Floor Space | Wt. in Lbs. | Code     |
|-----|------------|-------------|-------------|----------|
| 599 | 4' 6" x 6' | 6' 6" x 7'  | 1650        | QUOTIENT |

Additional Cross Clamp with connections, extra



### No. 600 Combination Sash and Door Clamp

THE design of this clamp embodies the quick acting features of our single purpose machines and is especially adapted to shops where the output does not warrant the installation of separate clamps or where floor space must be economized. The range is for sash up to 4 feet 6 inches wide by 7 feet long. Doors of the same width and about 6 inches longer can be handled.

The Operation is very rapid and changes can be quickly made for either sash or doors. One crank adjusts all four sash corners toward or from the center line, while the other moves the rear rail forward or back. Both cranks are at the operator's position. No measurements are required for either sash or doors nor is it necessary to square up after a change is made. The foot lever works in connection with two toggle joints so that considerable pressure can be exerted by light pressure on the treadle. A convenient device on the treadle releases the lock to open up the clamp.

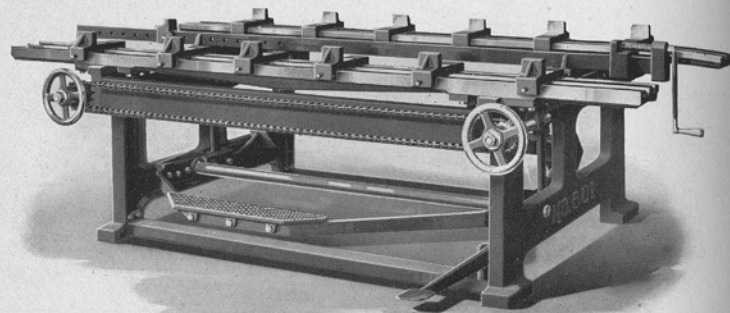
The Equipment consists of twelve door dogs, a set of standard sash corners and adjusting cranks. A set of short radius sash corners for light rail sash is furnished at extra charge, and we also furnish, when specified, an end clamp bar for doors.

| No.   | Capacity      | Floor Space      | Wt. in Lbs. | Code   |
|-------|---------------|------------------|-------------|--------|
| 600   | 4' 6" x 7' 6" | 7' x 7'          | 2200        | RADISH |
| 600-D | 4' 6" x 7' 6" | (for doors only) | 1700        | RADULA |

End Clamp Bar for Doors on No. 600 and 600-D, extra

Set of Special Short Radius Sash Corners for No. 600, extra





**No. 601 Heavy Single Motion Door Clamp**

**T**HIS Clamp is designed to handle all standard or heavy doors and it has the necessary strength and power to meet these requirements in every respect. It is a valuable machine in small shops doing a variety of work as well as in the larger door factories doing blind tenoned work.

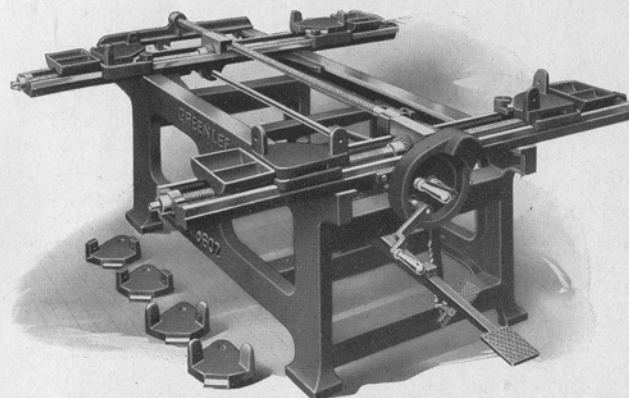
**The Design** embodies the use of a rear rail having connected screw adjustment for its full cross range and a front rail drawn up through powerful toggle joint levers by a foot treadle. The levers are so arranged that when the required pressure is obtained they lock and so remain until released by a separate pedal which opens up the clamp.

**The Range** is for widths from 14 inches to 4 feet 6 inches and the rails are 9 feet 3 inches long. The end clamp bar opens up 9 feet 6 inches and its clamping jaw has 4-inch movement by crank and screw, while the opposite dog is readily located by a steel pin in any of the fourteen holes spaced 3 inches apart.

**Special Range** can be provided in a larger clamp built only to order and at extra cost, which will open up 6 feet wide and has 10-foot 4-inch long rails. Its end clamp bar will take doors 10 feet 6 inches high.

**The Equipment** includes the end bar and twelve heavy dogs for doors. Sixteen small dogs for blinds are furnished when specified as a No. 601-B.

| No.   | Capacity    | Floor Space | Wt. in Lbs. | Code   |
|-------|-------------|-------------|-------------|--------|
| 601   | 4' 6"x9' 6" | 6' 6"x10'   | 2800        | RAFFLE |
| 601-B | 4' 6"x9' 6" | 6' 6"x10'   | 2900        | RAFFIA |



**No. 602 Quick Adjustable Sash Clamp**

**T**HIS quick adjustable self squaring sash clamp was developed from the original swivel corner machine introduced by us half a century ago. It has the advantages of our earlier patterns which are now successfully used by several thousand sash makers, but also has many improvements to secure the highest efficiency when clamping either stock or special size sash.

**Swivel Corners** apply pressure at eight points on the sash by a single movement of the foot lever which locks in position while the sash, supported by the flat swivel bases and center nailing blocks, is pinned. Double pin pockets are at each corner and a pedal release opens the clamp for the next sash.

**The Adjustment** for change in size is made in a few seconds by two hand cranks at the operator's position. One controls the four swivel corners, moving them simultaneously toward or from the center line and keeping them in perfect square. The other moves the rear rail forward or back two inches for each turn.

**The Range** is for working up to 5 by 7 feet and as small as 16x16 inch when extra short swivels for light rail sash are used. A center cross clamp for large factory sash may be added.

| No.                                       | Capacity | Floor Space   | Wt. in Lbs. | Code      |
|-------------------------------------------|----------|---------------|-------------|-----------|
| 602                                       | 5' x 7'  | 6' 6" x 8' 8" | 1450        | RADIATING |
| Set of Short Radius Swivel Corners, extra |          |               |             |           |
| Auxiliary Center Cross Clamp Bar, extra   |          |               |             |           |



### Sash Relishing

THE operation of relishing top or bottom rails consists of trimming down the width of tenon to correspond to the length of mortise in the stile. The moulding on the sash stile requires that clearance be provided at the shoulder of the tenon and this is accomplished by a relishing bit or by a hollow chisel and bit which works in conjunction with the relishing head and cuts slightly in advance of it.

In Fig. 1 the round clearance cut for the moulding has been made by a relishing bit. This is the usual method and is performed on our No. 604 and No. 605 Combined Relishers and Mortisers, as well as on our No. 612 and No. 612-P Double End Relishers. Fig. 2 shows a square cornered recess which is formed by a hollow relishing chisel and bit instead of the ordinary round relishing bit. This arrangement is used only on our No. 612-HC Machine and the advantage lies in obtaining a perfect fit for the moulding.

These Single and Double End Relishers represent the best in design and construction for performing the operations described above. They are in use in the majority of the leading sash factories in the country and are giving universal satisfaction.

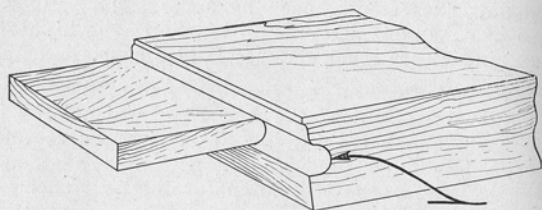


FIG. 1  
CLEARANCE FOR  
MOULDING ON THE  
STILE MADE BY  
RELISHING BIT

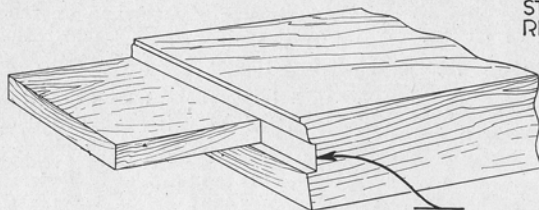
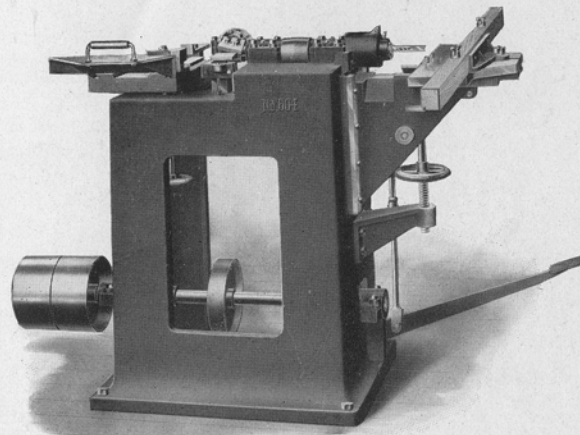


FIG. 2  
CLEARANCE MADE  
BY HOLLOW CHISEL  
AND BIT



### No. 604 Sash Relisher and Mortiser

THIS machine is built either as a combined sash relisher and mortiser with foot feed for the mortising table, or as a relisher only by omitting the mortising attachment. It has sufficient range for handling any sash, but for a large volume of heavy and hardwood work our power feed machines are recommended.

Mortising is performed on the table opposite the relishing side which permits the operator to work independently. The table feeds to the tools by foot lever and is provided with an adjustable fence, lay-out gauge and holding stops.

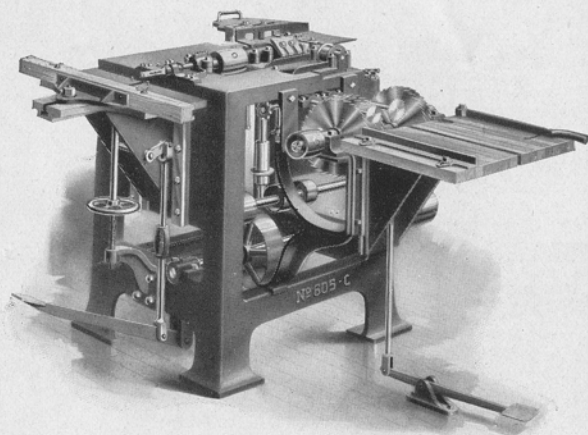
The Relishing Table slides in dovetail ways and its movement is regulated by stops. The relishing head is fitted on the opposite end of the mortising bit spindle, while the relishing bit spindle is driven from the countershaft below. The tenon is relished and the shoulder cut made with one motion.

The Countershaft is attached and has 9x4-inch tight and loose pulleys to run about 1000 R. P. M. A flexible coupling can be substituted for the pulleys for direct connection to a 2 H. P. motor of any speed up to 1200 R. P. M.

The Equipment includes two hollow chisels with bits, a relishing head, relishing bit, lay-out gauge, stops and wrenches.

| No.   | Style                 | Wt. in Lbs. | Code      |
|-------|-----------------------|-------------|-----------|
| 604   | Relisher and Mortiser | 975         | QUADRUPED |
| 604-A | Relisher only         | 800         | QUADRILLE |





No. 605-C Sash, Door and Blind Relisher and Mortiser

### No. 605 Sash, Door and Blind Relishers and Mortisers with Foot or Power Feed

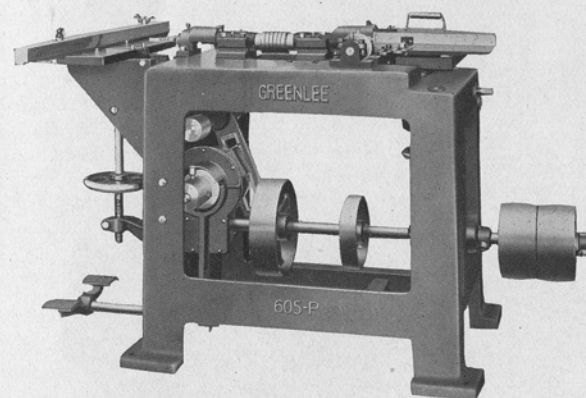
THE design of this No. 605 type represents the latest development in a combination machine for working sash, doors and blinds. It saves labor by mortising sash with one stroke, relishing rails at one pass, relishing door rails at one handling and cutting wedges by a second action.

**Mortising Sash** or similar work is done by means of a hollow chisel and bit which cut an accurate clean mortise. Stops lay out the work, chisels cut any shape or practicable size and the machine operates easily and without vibration. The mortising table may have either foot or power feed.

**Sash Relishing** is accomplished by the use of a cutter head working in combination with a special bit which bores into the shoulder to provide clearance for the sticking. The table has lay-out stops, and an adjustable chip breaker is furnished for the head.

**The Door Relishing Attachment** is shown above. The saws are easily adjusted and only a very short stroke is required for making the cuts. Guards, not shown, are furnished over the saws.

**A Blind Rail Router** can be added beneath the sash relishing table by which rails are relished and routed in one movement.



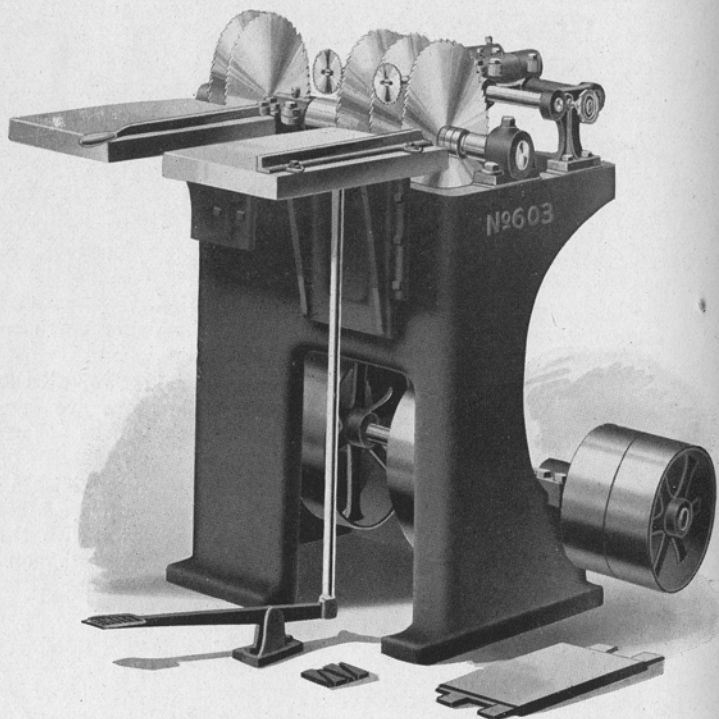
No. 605-P Sash Relisher and Mortiser with Power Feed

**Wedge Cutting Saws** are added to the door relisher when so ordered. Wedges are then cut by a second operation.

**Complete Adjustments** of ample range are provided for all the working tables, spindles and saws, and adjustable stops are provided for every operation. The door relishing saws can be spaced 9 inches apart for working extra wide rails.

**The Equipment** includes two hollow chisels and bits, relishing bit and head, stops, gauges, wrenches, a routing bit with the blind router, saws for the door relisher, and two large saws with the wedge cutter. Countershaft on frame has 9x4½-inch tight and loose pulleys, running 1000 R. P. M. or a coupling for connecting to a 3 to 5 H. P. motor running 1200 R. P. M. or less.

| No.                                                | Combination                                                       | Feed  | Code       |
|----------------------------------------------------|-------------------------------------------------------------------|-------|------------|
| 605-P                                              | Sash Relisher and Mortiser                                        | Power | QUAILED    |
| 605-B                                              | Sash Relisher and Mortiser with Blind Router                      | Foot  | QUAINTLY   |
| 605-BP                                             | Sash Relisher and Mortiser with Blind Router                      | Power | QUAINTNESS |
| 605-C                                              | Sash and Door Relisher and Mortiser                               | Foot  | QUANTUM    |
| 605-CP                                             | Sash and Door Relisher and Mortiser                               | Power | QUANTIFY   |
| 605-D                                              | Sash and Door Relisher and Mortiser with Wedge Cutting Attachment | Foot  | QUARRY     |
| 605-DP                                             | Sash and Door Relisher and Mortiser with Wedge Cutting Attachment | Power | QUARRIED   |
| Blind Routing Attachment on last four types, extra |                                                                   |       | QUAGMIRE   |



No. 603 Single Motion Door Relisher  
With Wedge Cutting Attachment



### No. 603 Single Motion Door Relisher

THE illustration shows our improved pattern of Standard Door Relisher, including the Wedge Cutting Attachment. A similar relisher is made as a part of the Combination Sash, Door and Blind Relishing and Mortising Machine, but the separate machine is often more convenient, since it can be located at the proper point in the shop for doing its class of work. This machine will relish wide or narrow door rails to single or double tenons and trim the shoulders to proper length.

Its **Superiority** lies in the very complete adjustments, ample power, easy changing from one set of work to another, and its safety as compared with that of a vertical spindle machine.

The **Design** of this Relisher includes a set of large saws, adjustable with special collars on the horizontal main spindle, and a pair of auxiliary cut-off saw arbors mounted in frames and having lateral adjustment. All spindles are driven from the countershaft located at the rear of the machine base.

The **Main Spindle**, mounted in adjustable and removable boxes, is fitted with a special form of split collar which firmly supports the saw. The cut-off spindles are mounted in yoked boxes with ample drive pulleys and are adjustable on their double turned ways.

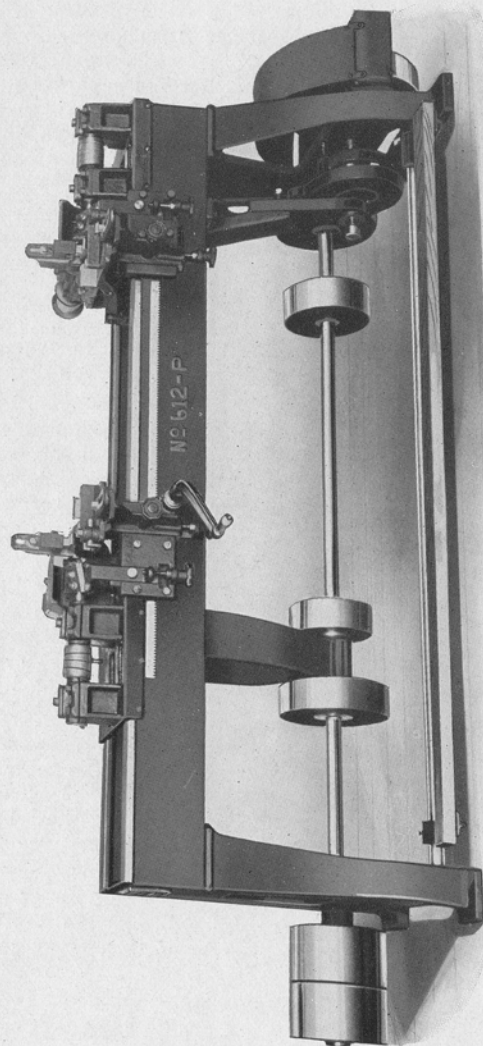
The **Wedge Cutting Attachment**, which can be added when required, consists of two extra saws on the extended main spindle and a table of ample size. The saws are adjustable by the same means as those on the main spindle. The gauge on the table has angular motion with stops for straight and angle positions. This attachment, with one saw and special gauges is very useful for trimming the corners of tenons to be fitted in rounded bottom mortises.

In **Operation**, the door rail is placed on the main table and moved forward into the saws until it strikes the stops. The table is then raised by the foot lever, bringing the rail against the cut-off saws which trim the shoulders. Releasing the foot lever, the table automatically returns to its working height. The wedges, required for doors tenoned through the stile, are cut on the wedge cutting saws.

The **Equipment** of the machine includes a full set of splitting and cutting-off saws, gauges, stops, wrenches and the countershaft at the base with a motor coupling or 9x4¼-inch tight and loose pulleys running 1000 R. P. M.

| No.   | Style                 | Floor Space | Wt. in Lbs. | Code     |
|-------|-----------------------|-------------|-------------|----------|
| 603-A | Relisher Only         | 4' x 3' 6"  | 800         | RACKET   |
| 603   | With Wedge Attachment | 4' x 3' 6"  | 875         | RACKRENT |





No. 612-P Double End Sash Relisher with Power Feed



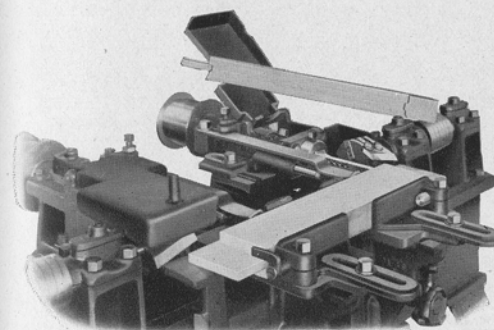
## No. 612 Double End Sash Relishers

OUR Double End Relishers are offered to secure greater production by relishing both ends of sash rails at the same time and with one stroke. They combine speed with accuracy and permit perfect duplication of work. Ample range is provided and quick adjustments can be made for different sizes.

The Frame is of the lathe bed type with planed ways on which the bases carrying the spindles and table slides are mounted. One base is adjustable lengthwise by rack and pinion to accommodate different length rails and the drive pulleys move with it.

The Relishing Operation is performed by a cutter head working in conjunction with either a relishing bit which makes a round shoulder cut, or a hollow chisel and its bit which forms a square

recess to exactly fit the sticking on the stile. The foot feed machine is built only for using a relishing bit, while the power feed machine is built in either of the two types.



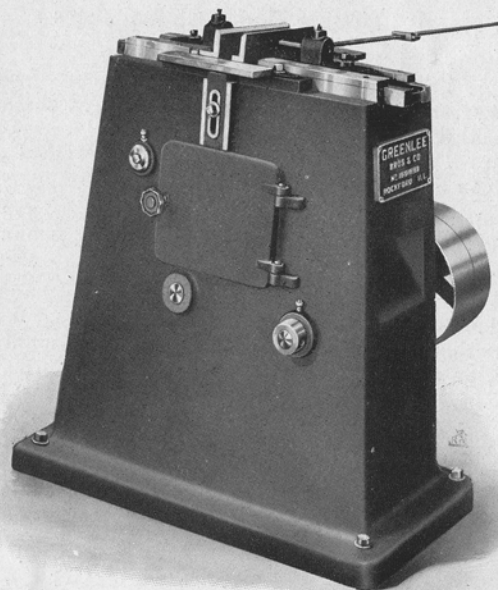
Section showing Cutter Head and Hollow Chisel

The Power Feed is controlled by pressing a foot lever which engages a friction. The construction is such that the tables will either feed continuously or stop after each complete stroke. Stock of any length can be worked very rapidly.

The Range is sufficient for all thicknesses of rails in widths to 6-inch, and lengths from 14 to 53-inch between shoulders.

The Attached Countershaft has 10x5-inch tight and loose pulleys to run about 1000 R. P. M., or a flexible coupling for direct connection to a 3 or 5 H. P. motor running 1200 R. P. M. or less.

| No.    | Type          | Feed  | Floor Space | Wt. in Lbs. | Code      |
|--------|---------------|-------|-------------|-------------|-----------|
| 612    | Relishing Bit | Foot  | 8' 5"x3'    | 1500        | QUEENLY   |
| 612-P  | Relishing Bit | Power | 9'x3'       | 1725        | QUENCH    |
| 612-HC | Hollow Chisel | Power | 9'x3'       | 1800        | QUENCHING |

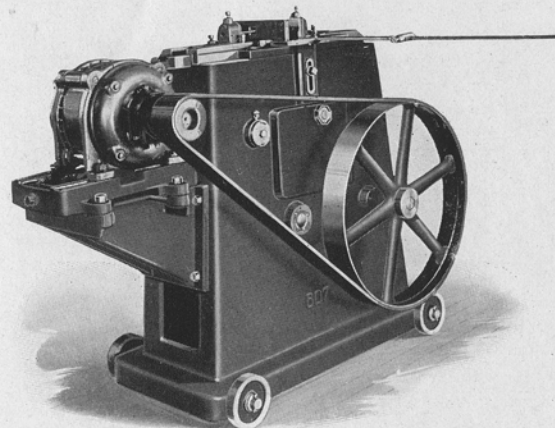


No. 607 Automatic Sash Franker

THE operation of franking is met with in making both the stiles and the bars of small-light sash and also in other lines of special work, such as sled runners, where very thin mortises are necessary. The success of our No. 607 machine lies in the fact that two special forms of solid chisels are used in opposition to each other in order to remove the core from the cut without tearing the wood.

The Essential Feature of this Franker consists of a reciprocating chisel ram actuated by a specially formed cam which varies the rate of this movement. The cam is fitted in a large gear which is driven from the pinion on the drive shaft.

The Stroke is made by advancing one chisel until more than half way through the piece and then, as it is withdrawn, the opposite chisel is forced through the stock and by its quick final movement drives out the core. A face plate shaped to conform with the sticking prevents the stock from tearing out when the core is removed by the second chisel.



No. 607-MP Portable Motor Driven Franker

The Chisels are held in plain chucks on the ram and are forged from tool steel with cutting edges on each side tapered back toward the center. They are usually of a width equal to three times their thickness.

The Speed of Work is fixed by the drive shaft speed. A fast operator can handle 45 pieces per minute in sash work at the highest speed given below. On some hardwood or more exacting work, lower speeds are advisable.

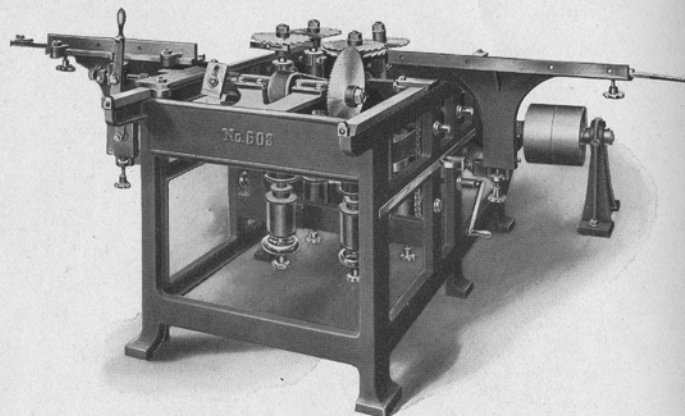
The Range is for mortises in stock not over  $1\frac{1}{2}$  inches thick, and for chisels up to  $\frac{3}{4} \times \frac{3}{16}$ -inch size, except on special order.

A Portable Franker with independent motor drive is shown above. The advantage obtained by portability is that the machine can be placed immediately behind whatever sticker is in use on stock requiring franking, and operated by the man taking away from the sticker.

The Equipment includes a pair of chisels, the gauge, two face plates, lay-out bar and stops. The attached drive shaft has  $12 \times 3\frac{1}{4}$ -inch tight and loose pulleys running from 150 to 225 R. P. M. For direct drive, a 1-HP motor may be mounted on a bracket attached to the machine frame.

| No.    | Style                         | Floor Space | Wt. in Lbs. | Code     |
|--------|-------------------------------|-------------|-------------|----------|
| 607    | Stationary                    | 2' x 3'     | 900         | RAGOUT   |
| 607-MP | Portable (motor not included) |             | 1020        | RAGOUNCE |





No. 608 Double Side Sash Dovetailer or Slotter

FOR many years our Sash Dovetailers have held a place as the most efficient for this work in the leading sash factories. The design of this machine includes two sliding tables, the right for working stiles and the left for check rails, with rocking adjustment when dovetailing, four adjustable vertical spindles and a horizontal spindle for cutting off and tenoning.

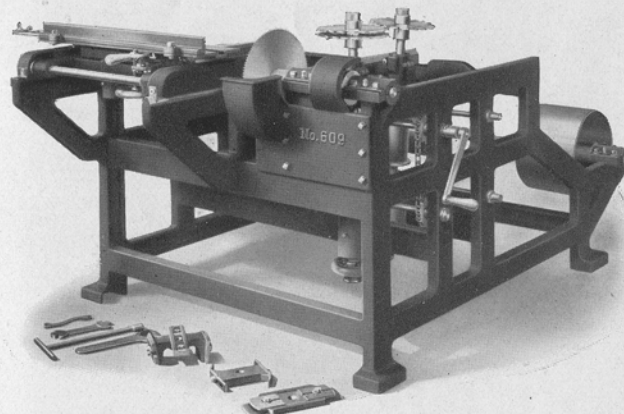
The Frame is strong and wide, with double cross girts to support the vertical spindles. The side frames have dovetailed ways on the top, and tracks for the friction rollers on the outside.

Both Tables have vertical adjustment and lay-out gauges. They are gibbed to planed ways on the frame, and have roller guides to reduce the sliding friction. The left table has a lever rocking adjustment with automatic stops.

All Spindles have pulleys between double boxes and are driven by long belts. The lower boxes of the vertical spindles are taper step bearings having independent vertical adjustment. All spindles have graduated spacing collars and fine screw adjustment.

The Equipment includes five grooving saws, a cut-off saw, a tenoning and a coping head, an equalizing saw, spacing collars for all spindles, gauges, stops, wrenches, and the attached countershaft with flexible motor coupling or 10x5-inch tight and loose pulleys running 900 R. P. M.

| No. | Floor Space | Wt. in Lbs. | Code    |
|-----|-------------|-------------|---------|
| 608 | 6' 3"x7'    | 1750        | RACCOON |



No. 609 Combination Sash Dovetailer or Slotter

THIS single side combination machine is extremely quick and convenient for changing set-ups. It is easy running because of the widely spaced ways for the roller bearing table. These features have made it a popular and valuable machine for shops where stock or special dovetailed or slotted sash are produced.

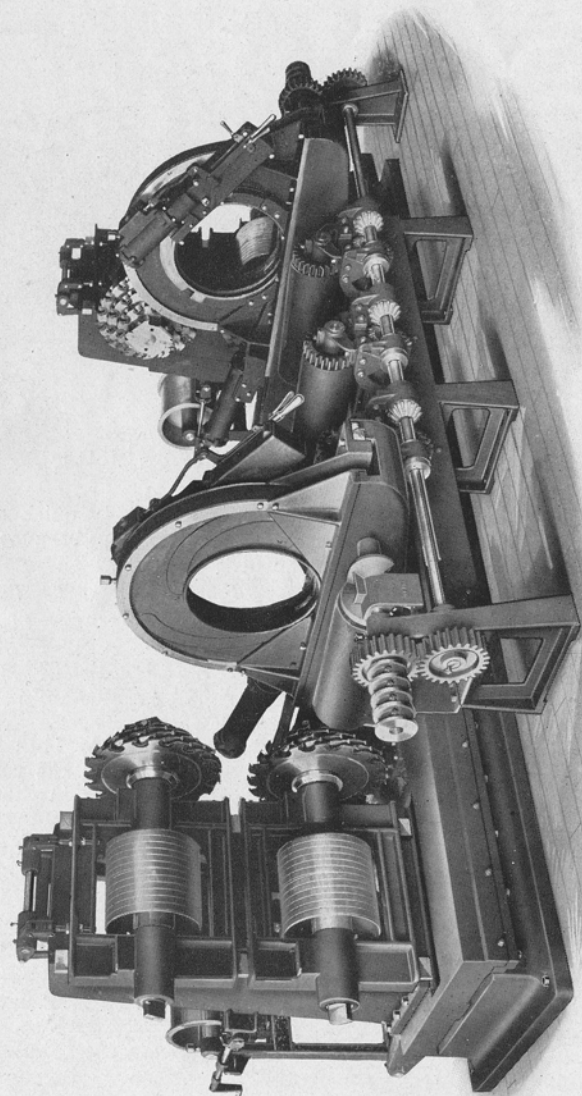
The Two Vertical Spindles have transverse and tilting adjustment by lead screws operating independently or together. Screw vertical adjustment is also provided and a full set of graduated spacing collars is furnished for each spindle.

The Horizontal Arbor can carry the trim saw, or both the tenoning head and combination cut-off saw. This arbor has vertical adjustment for its bearings, a point of convenience in changing work, and is fitted with necessary spacing collars.

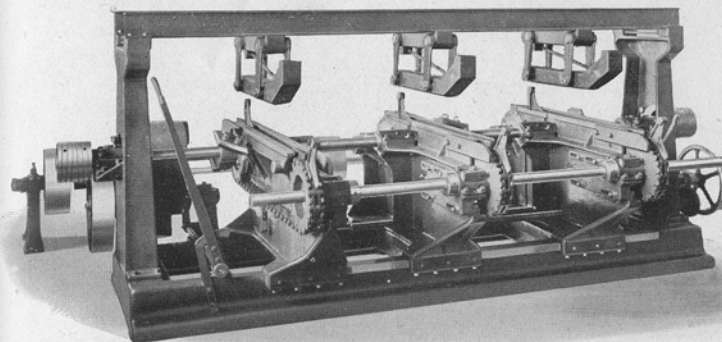
The Work Table is vertically adjustable and has double tilting adjustment for dovetailing on the No. 609 type. The No. 609-B Sash Slotter is without the tilting table.

The Equipment includes one trim saw, one combination cut-off saw, three 1/4-inch grooving saws, a tenoning head, cope head, lay-out stops, wrenches and an attached countershaft with 9x4 1/4-inch tight and loose pulleys, running 800 revolutions. A 3 H. P. motor may be direct connected at 900 R. P. M.

| No.                         | Floor Space | Wt. in Lbs. | Code     |
|-----------------------------|-------------|-------------|----------|
| 609 with Tilting Table      | 4' 3"x7'    | 1500        | RABID    |
| 609-B without Tilting Table | 4' 3"x7'    | 1500        | RABBINIC |



No. 691 Automatic Double End Mine Timber Framer With Guards Removed



Cribbing Timber Framer

### Framers for Mine and Cribbing Timbers

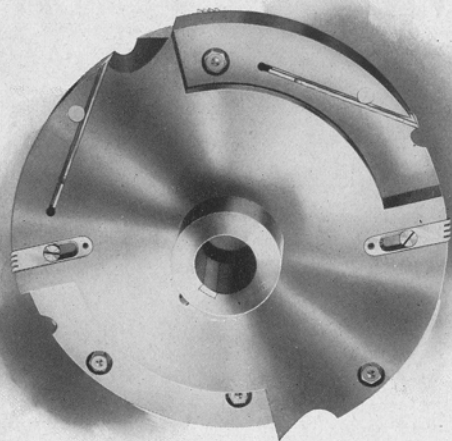
OUR special line of Mine Timber Framers includes machines for forming any type of stall or square sets for stopes, from either round logs or square timbers, as well as machines for working any class of shaft timbers. We illustrate only the Automatic Double End type, but we build simpler machines in both the Double and Single End types with hand controlled feed. We also build Cribbing Timber Framers and this type of machine is illustrated above.

Complete Timber Framing Mills have been supplied by us to some of the largest mines and we are prepared to design such installations to meet any conditions. Besides these framing machines we call attention to our Vertical Automatic Cut-off Saws with suitable rolls or carriage for logs or timbers. Shaft timber framing can be most economically done on our Mortising, Boring and Gaining Machines which are described in this catalog. Special arrangements of these can be made to suit any class of work.

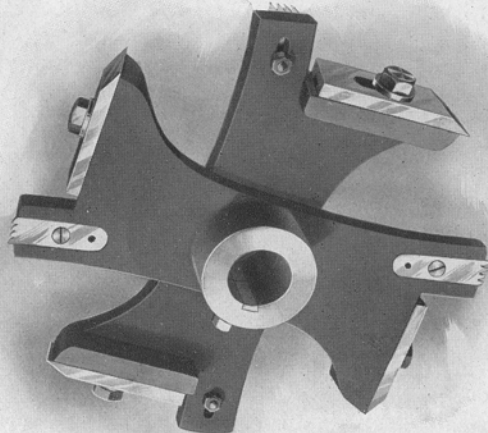
Slab Saws of the simple type or in our complete automatic design can also be furnished, as well as log haul-ups and other conveying or transmission machinery. The automatic slab saws have an endless traveling bed placed in line with the main train of rolls delivering the framed timbers, and they are so arranged that logs to be slabbed are cared for without extra labor, under the direction of one of the framing machine operators.

Our Illustrated Bulletin on Mine Timber Framers will be furnished upon request to those interested in this class of equipment, and we shall be glad to supply information on the other types upon being advised fully regarding requirements.





No. 701-B Solid Type Expansion Gaining Head



No. 701-A Four Wing Expansion Gaining Head

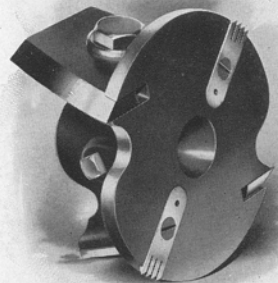


### Expansion Gaining Heads

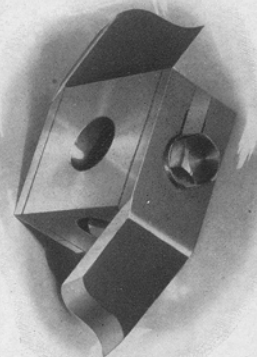
OUR standard types of Expansion Gaining Heads are made in a large variety of widths and diameters for use on Gainers and Wood Workers. Gun metal bronze is generally used for these heads since it is very strong and tough and is free from hidden defects, but we can furnish them in cast steel or cast iron.

The **Four Wing Head** is an excellent type for large diameters and widths, because of its moderate weight and easy cutting. It has shear cutting knives which equals the width of the head when sections are closed for the narrowest cut. It is not recommended for widths less than 1-inch, although it is to be preferred for the extra widths and for diameters over 16-inch.

The **Solid Type** is also used extensively, and it is preferred by most mechanics for wide heads in the smaller diameters, as used on Wood Workers. It has many improved features and its strength and balance is carefully preserved.



Tenoning Head



Cope Head

### Tenoning and Other Heads

THE above cuts show the standard heads manufactured for our Heavy Sash and Door Tenoner. We also make cutter heads for all machines and are in a position to furnish these for all classes of work. Saw type groovers or dado heads can also be furnished.



### Woodworkers' Vises

GREENLEE Vises, built under the Evans patents, embody all the principles that go to make up one's conception of a perfect vise. Before being placed on the market, they were subjected to the most rigid and searching tests to bring out any possible weakness in either principle of operation or parts. Some of their most important features are as follows:

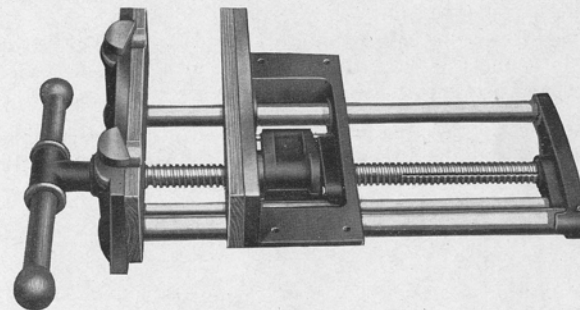
1. Quick action available at any position of the handle.
2. Continuous screw action in both directions.
3. A whole screw unutilized by grooves.
4. A complete nut fully engaging the screw.
5. Dogs adjustable by the fingers only, and arranged to handle irregular shapes without marring.
6. 100% certain in operation, with premature releasing of the work impossible.



**Quick Action** is always available in these vises, regardless of the position of the handle. It is not necessary to bring it to any stated position or to turn it backward against the resistance of spring clutches or other mechanism. The screw, by a vertical movement of less than one-half inch disengages the lower half nut, and simultaneously, by means of a lever connection, throws the upper half nut clear. It is an ingenious mechanism, smooth working and simple.

**Continuous Screw Action** in both directions means that the quick acting feature does not interfere when it is not desirable to use it. It is there when it is wanted, but it doesn't intrude when it is not wanted.

**In General Design** and workmanship, these vises maintain the sterling qualities of Greenlee products. Attention is called to the all-wood handles which are superior to those with metal ends.



Greenlee Cushion Grip Vise

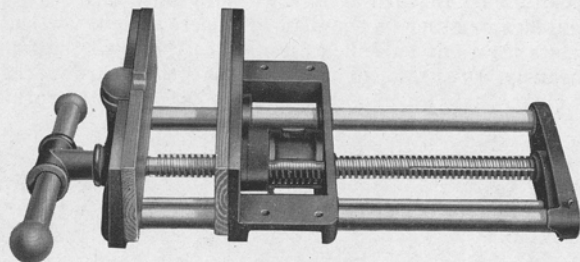
The **Cushion Grip** is an absolutely new feature in vise construction and is found only in the Greenlee Vises of this name. In effect it is equivalent to giving the workman a third hand. For about three-quarters of a turn before the power of the screw is exerted, and also following its release, the work is gripped lightly enough to permit it to be adjusted with the hands, yet with sufficient force to keep it from dropping. This is of real practical value, especially where several pieces are worked together.

Greenlee No. 1-B Cushion Grip Vise with twin adjustable dogs in front jaw and one adjustable dog for the bench. Jaws 10 inches long by 4 inches deep above the slides, and will open 12 inches. Both jaws maple lined.





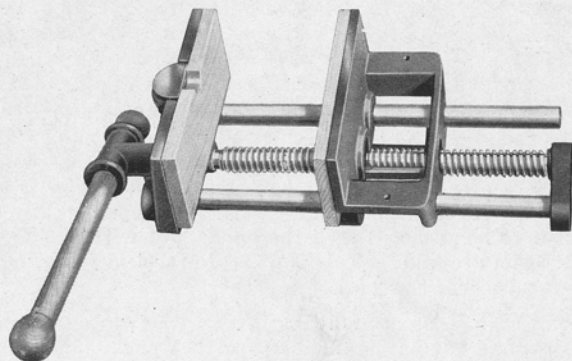
### Woodworkers' Vises—Continued



Greenlee Instant Grip Vise

The Instant Grip Vises differ from the Cushion Grip type in that an almost instantaneous gripping or releasing of the jaws takes place through about one-eighth of a turn of the screw. This feature in connection with the quick action of all these vises, provides a speed of operation hitherto unknown.

Greenlee No. 2-A Instant Grip Vise with one adjustable dog in the front jaw and one adjustable dog for the bench. Jaws 10 inches long by 4 inches deep above the slides, and will open 12 inches. Both jaws maple lined.



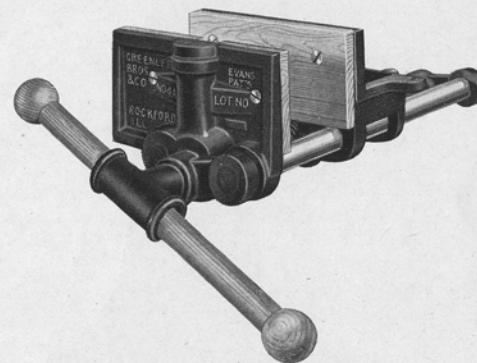
Greenlee Junior Vise



The Junior Vises are smaller and lower in price than those just described. They have the same features of operation found in the Instant Grip Vises, but the construction is somewhat different. They are recommended particularly for use in the lower grades in manual training work, or where funds are not available to secure the Cushion Grip or Instant Grip types.

Greenlee No. 3-A Junior Vise with one adjustable dog in the front jaw and one adjustable dog for the bench. Jaws 8 inches long by 3½ inches deep above the slides, and will open 10 inches. Both jaws maple lined.

Greenlee No. 3 Junior Vise as above, but without dogs.

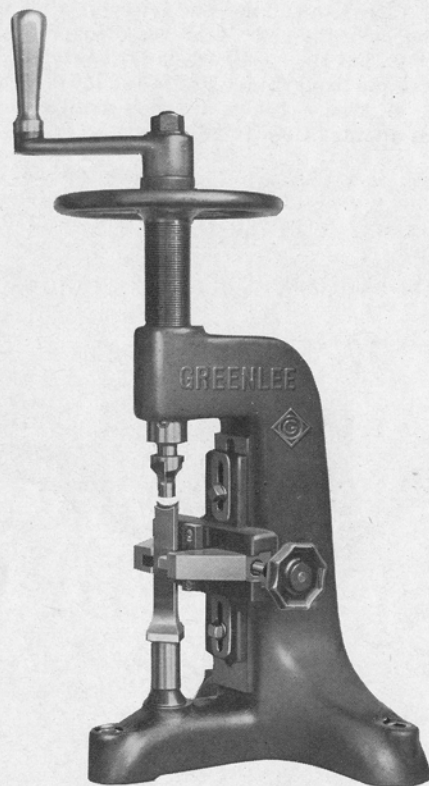


Greenlee Tail Vise

The Tail Vise shown above has the same mechanism as the No. 3-A Junior, but the jaws are arranged to hold work either on the side or above the slides, which fits it for any class of work.

Greenlee No. 4-A Tail Vise with single adjustable dog in the front jaw and one adjustable dog for the bench. Jaws 7½ inches long by 4 inches deep with 3½-inch clearance above the slides and 2¼ inches to one side of the slides. Jaws open 10 inches and both are maple lined.

*A small booklet with more complete illustrations and description of Greenlee Vises will be sent upon request.*



Patent Applied For

### No. 720 Hollow Chisel Sharpening Machine

UNTIL recently, the only method available for resharpener hollow chisels has been by hand filing. Considerable time can be consumed in this way, and in many cases tools have been discarded because of the work required to put them in usable condition. In view of the fact that Greenlee Mortising Tools are accepted as standard by woodworkers generally, it is only natural that we should develop a machine to reduce the cost of keeping them in proper condition.



The Sharpening Machine shown on the opposite page eliminates practically all hand filing. In addition to the time saved and the proper cutting edges obtained, it permits reclaiming many tools which would otherwise be scrapped. It is hand operated and can be fastened to a bench or mounted on a post for convenient use.

The Sharpening Process consists of feeding the spindle downward by the hand wheel, while being rotated by means of the crank, after the chisel has been clamped in place and the cutter has been brought in contact with the end of the chisel. The entire operation is quickly performed and is complete when the outside angle of the cutter has cut to the corner of the chisel, as shown by photograph "B."

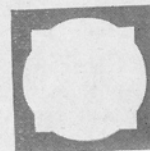
Hand Filing consists simply of completing the corner grooves with a square file, as shown by photograph "C". When chisel corners are broken or split, the end of the tool should be ground or filed square as shown by photograph "A", before inserting in the sharpening machine.

The Double Angle Cutters for use in this machine are made with a pilot to fit the bore of Greenlee Hollow Chisels and are furnished only for this make of tools.

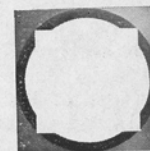
The Capacity is for chisels up to 1 1/4-inch square and of overall length up to 6 3/4 inches, which is that of a standard Greenlee 5-inch blade chisel with a 1 3/4-inch long shank.

Shipping Weight, 80 lbs

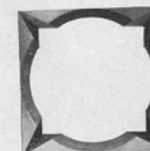
Code, RUBATO



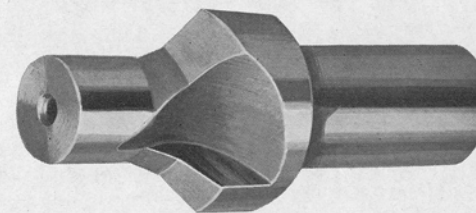
A



B



C



Double Angle Cutter for Chisel Sharpener

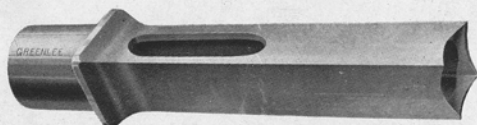
Patent Applied For



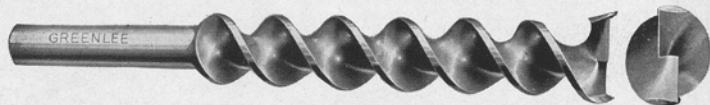
### Hollow Chisels and Hollow Chisel Bits

THE manufacture of mortising tools was taken up in connection with our development of Hollow Chisel Mortisers. To obtain the best results with these machines, it is necessary that correct tools be used. The development of these tools has kept pace with the development of our machines and we believe we are correct in our statement that we are the only machine builders who produce both hollow chisels and bits. The illustrations on the following pages represent a few standard tools selected from our line. Our complete catalog of Mortising and Boring Tools will be sent upon request.

We show two types of Hollow Chisels and Bits, the Regular and the Hard-Wear. The chisels differ only in having one opening for the Regular as compared to two for the Hard-Wear. The regular type of bit is made with square cutting edges and knife-edge spurs, but without a point while the Hard-Wear bit has broad-face cutting spurs and a brad point. The regular type in both tools are always furnished, unless otherwise specified. All tools are made from special steel and are carefully heat treated.



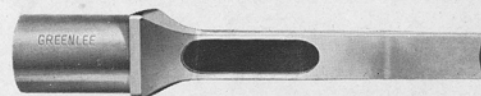
Nos. 104-B and 105-B Regular Hollow Chisels



Nos. 124-B and 125-B Regular Hollow Chisel Bits

The Regular type of Hollow Chisel shown above is made with a blade length of 6½ inches as No. 104-B and with a blade length of 8 inches as No. 105-B. Other lengths are special. Sizes from ¾ to 2½ inches square are carried in stock.

Bits for this type of chisel are made with 10-inch twist and 14-inch overall length as No. 124-B, and with 11-inch twist and 15-inch overall as No. 125-B.

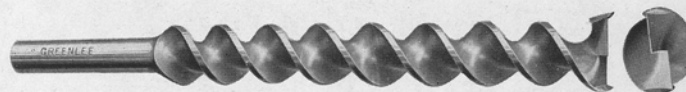


No. 103-B Regular Hollow Chisel

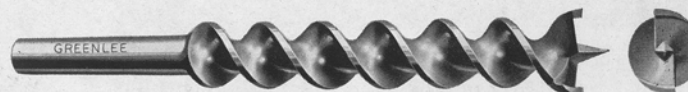


No. 103-H Hard-Wear Hollow Chisel

The chisels shown above are furnished with 5-inch blades and carried in stock in sizes from ¾ to 1¼ inches square in the Regular type and from ¾ to 1-inch in the Hard-Wear pattern. All sizes of 5-inch blade chisels are now made with straight blades and will mortise to a depth of about 3¾ inches. On extra hard wood or woods that are difficult to machine, the Hard-Wear type is recommended. Bits used in both types are our No. 122-B or No. 122-H shown below.



No. 122-B Regular Hollow Chisel Bit



No. 122-H Hard-Wear Hollow Chisel Bit

The No. 122-B and No. 122-H bits shown above are for use in the 5-inch blade chisels of either the Regular or Hard-Wear types. They have 7-inch twist and are 10 inches overall.

Ask for our complete catalog of Mortising and Boring Tools



### Hollow Chisels and Bits—Continued



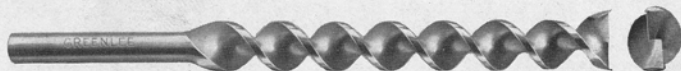
Nos. 101-B and 102-B Regular Hollow Chisels



Nos. 101-H and 102-H Hard-Wear Hollow Chisels

The No. 101-B Hollow Chisels have 4-inch blades and are carried in stock in sizes from  $\frac{1}{4}$  to  $\frac{7}{8}$ -inch. The  $\frac{1}{4}$  and  $\frac{5}{16}$ -inch have re-enforced blades to mortise  $1\frac{7}{8}$  inches deep, while the other sizes have straight blades and will mortise to a depth of about 3 inches. The No. 102-B Hollow Chisels have  $2\frac{3}{4}$ -inch straight blades and are carried in stock in sizes from  $\frac{1}{4}$  to  $\frac{3}{8}$ -inch.

The No. 101-H and No. 102-H chisels correspond to the Regular types mentioned above, but are made with double openings for rapid chip clearance.



Nos. 120-B and 121-B Regular Hollow Chisel Bits



Nos. 120-H and 121-H Hard-Wear Hollow Chisel Bits

The No. 120-B and No. 120-H Bits are for use in our 4-inch blade chisels. They have 6-inch twist and are furnished with an overall length of 9 inches.

The No. 121-B and No. 121-H Bits are for use in the  $2\frac{3}{4}$ -inch blade chisels. They have  $4\frac{1}{4}$ -inch twist and an overall length of 8 inches.

Ask for our complete catalog of Mortising and Boring Tools



### Machine Bits

THIS catalog illustrates and describes a very complete line of single spindle and gang machines for wood boring. The manufacture of boring tools was taken up in connection with the development of these machines, and we now produce a complete and superior line of bits for all classes of work. They are made from the toughest steel obtainable for the purpose, are finished by workmen of long experience and are properly proportioned for strength, fast work and long life.

The following illustrations represent only a few of our standard bits for machine use. We make many other patterns and with various types of heads to suit the class of work to be handled. Our complete catalog of Mortising and Boring Tools will be sent upon request.



No. 150 Double Spur Machine Bit

This No. 150 Double Spur is the general purpose machine bit and our principal stock is carried in this pattern. The bit is suited for very rapid work in all kinds of wood and requires a minimum amount of power. It will bore smoothly enough for any purpose except possibly the most exacting requirement such as some kinds of cabinet work.

We illustrate this bit with single screw point as more commonly required. We can make special with any practical pitch, single or double screw, or with brad point.



No. 151 Extension Lip Machine Bit

The No. 151 Extension Lip Machine Bit is preferred by many who desire to do particularly careful boring as in furniture and cabinet work. This bit will do smoother work than any other type or pattern now in use.

Ask for our complete catalog of Mortising and Boring Tools

### Machine Bits—Continued



No. 155 Solid Center Machine Bit

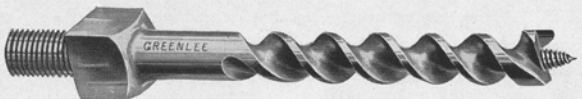
The Solid Center type of Machine Bit is offered where there is a demand for a boring tool having greater stiffness than that of the double twist type. It is practical for work requiring great strength, and it combines rigidity with good clearance, free cutting and long life.

While the Solid Center Bit is best known in the pattern shown above, we also supply this type of tool with any of the various head patterns commonly used.



No. 157 Ship Auger Machine Bit

This pattern of bit with single spiral and cutter is a stiff, strong tool suited for boring to extreme depths. It is very commonly used in car, bridge, dock and ship work, particularly in portable boring machines. This type of bit is also furnished without a point as No. 158. It is used for deep boring and will not lead off with the grain of the wood to the extent of bits with point.



Nos. 163 and 164 Screw Shank Dowel Bits

All stock Screw Shank Dowel Bits are  $4\frac{1}{2}$  inches long overall and are of the Extension Lip pattern. Other patterns can be made to order. The No. 163 has a  $\frac{1}{16}$ -inch, 20 thread shank and the No. 164 a  $\frac{7}{16}$ -inch, 14 thread shank.

Ask for our complete catalog of Mortising and Boring Tools



No. 180 Countersink Machine Bit

Countersink Machine Bits are very economical wherever concentric holes of varying diameters are required. Their use in such cases avoids at least one handling of stock, and usually permits of better work being done.

The No. 180 Countersink Machine Bit shown above has both cuts of the double spur pattern, and is the one most commonly specified. Our No. 181 is similar except that the larger diameter cuts a bevel to correspond to a screw head. Our No. 182 has larger cut similar to the No. 181 but with the lead of the taper head drill type.



No. 188 Split Shank Countersink

The No. 188 Countersink has a split shank  $\frac{1}{2} \times 1\frac{1}{2}$ -inch and overall length of 4-inch. This will make a flat bottom hole as required for the setting of bolt heads, washers, etc. The drill for use in this countersink is our No. 175 Straight Shank pattern having a  $2\frac{1}{2}$ -inch long twist,  $3\frac{1}{2}$ -inch shank and overall length of 6 inches.



No. 188 $\frac{1}{2}$  Split Shank Countersink

Our No. 188 $\frac{1}{2}$  Countersinks are made with overall length of 3 inches and have  $\frac{1}{2} \times 1\frac{1}{2}$ -inch split shank. The cutting parts produce a bevel hole corresponding to the taper on the head of a wood screw. The inside drill, our No. 175 $\frac{1}{2}$  Straight Shank pattern, is regularly furnished with a 2-inch long twist,  $2\frac{1}{2}$ -inch shank and overall length of  $4\frac{1}{2}$  inches.

Ask for our complete catalog of Mortising and Boring Tools



### Machine Bits—Continued



No. 176 Taper Head Drill

The Twist Drill is a satisfactory wood boring tool where the holes are of moderate size or depth. The ordinary metal drill is not efficient for boring wood and the tool we offer is designed for this purpose to allow free cutting and more chip clearance. Our drills are backed off on the edge of twist to prevent friction, but are left with a small portion full size so that the diameter will be maintained as the drill is shortened in resharpening.



No. 177 Spur Machine Drill

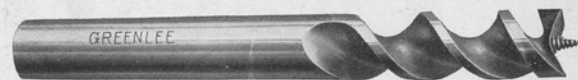
The Spur Machine Drill is offered as a tool having the durable, economical features of other drills, but fitted with spurs and point so that it will more nearly approach the smooth boring qualities of a bit. If care is used in sharpening, the brad point and spurs may be maintained and the drill will continue to give service until worn too short for required range.



Nos. 141 and 142 Routing Bits

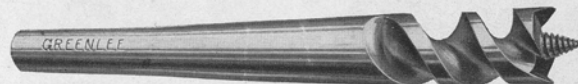
The Routing Attachment on our Relisher and Mortiser requires a bit as shown. This tool is 3½ inches overall, both shank and flute measuring 1¼ inches. In ordering, routing bits should be specified as No. 141 to run left hand, or No. 142 to run right hand. These are regularly furnished with a square cutting end, as illustrated, but special forms can be provided.

Ask for our complete catalog of Mortising and Boring Tools



No. 160 Felloe Boring Bit

The name denotes the purpose of these bits. They are carried in stock in sizes from ⅜-inch to ¾-inch, all stock tools having 2-inch twist and ½x3-inch shank.



Nos. 161 and 162 Relishing Bits

The No. 161 Relishing Bit is standard for all older Greenlee Sash Relishing Machines. These are made with the shank straight ⅜-inch diameter for one-half of its length and tapering to the diameter of the twist for the remaining half.

The present Greenlee Relishing Machine takes bit with ½-inch shank, known as the No. 162 Relishing Bit. Like the older bit, this is made with Extension Lips and both measure about 5¼ inches long overall.

### Bits and Chisels for Hand Use

IN the preceding pages on Mortising and Boring Tools, we have attempted to show only some of our standard patterns. Many others are included in our tool catalog and we also undertake the making of special tools for any ordinary requirements.

After developing a complete line of Machine Boring Bits, we undertook the manufacture of hand boring tools. We now offer a most complete and superior line of Auger Bits and Augers in all types and for all classes of work. We also manufacture a full line of Carpenters' Chisels, Gouges, Turning Tools and Draw Knives.

Since these hand tools bear no particular relation to our line of Woodworking Machinery, we are not including any of them in this catalog. We shall be glad, however, to send our catalog on such tools to those interested.



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